

REMARKS/ARGUMENTS

Claims 1-2, 11, 15-16 and 21-33 are presently in this application.

A typographical error has been corrected in claim 11. Sodium is obviously an alkali metal not an alkaline earth metal.

Claims 1-2, 11-13, 15-16 and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Owens Jr. (5,107,864) in view of Hansen et al (5,300,192). Hansen has been cited for the application of water soluble coating materials at 10 to 50% concentration to cellulosic webs.

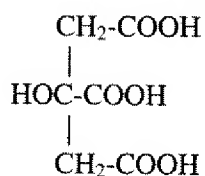
Owens is directed to a cigarette paper. The paper contains from 2 to 40% carbon, from 2 to 35% magnesium hydroxide and from 5 to 50% calcium carbonate. It also contains from 0.5 to 6% of a burning chemical selected from the alkali metal salts of citric, malic, lactic, glycolic, tartaric, fumaric, maleic, malonic, glutaric, adipic, acetic, succinic, hydrochloric or phosphoric acids. It also contains 1 to 10% of an acid compatible with the burning chemical, and 1 to 10% of a mono-, di-, tri-, or poly-saccharide.

There is no reason for one concerned about cockle, water fastness or compatibility with florescent whitening agents or optical brighteners to look at burning chemicals in cigarette paper. There is no disclosure in Owen that would cause one to pick a particular burning chemical from a large genus of burning chemicals.

Owens is an invitation to experiment, not a disclosure. Owens states that the alkaline metal salt of citric, malic, lactic, glycolic, tartaric, fumaric, maleic, malonic, glutaric, adipic, acetic, succinic, hydrochloric or phosphoric acids may be used. There is no indication that one is better than the others. That is because they are burning chemicals in a cigarette paper. There is no disclosure in Owens that would cause one to select one of these salts over any of the others. Owens has disclosed a large genus. Owens does not disclose that a particular species within the genus that has properties that are different from the other salts in the genus. There is no disclosure that any of these salts reduce cockle. There is no disclosure that one of them has the attribute of reducing cockle.

Each of the chemical in the large genus disclosed by Owens is different. I will use a sodium salt to explain the differences.

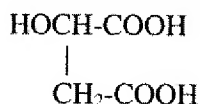
Citric acid is an organic acid having the following formula:



It has a three carbon chain with a carboxylic acid group attached to each of the carbons and a hydroxide group attached to the middle carbon. There are two hydrogens on each of the

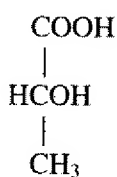
outer carbons. It has three carboxylic acid groups. Because there are three carboxylic acid groups there are three possible salts – a mono salt, a di salt or a tri salt. A mono sodium salt of citric acid would have sodium attached to one of the carboxylic acid groups and two free carboxylic acid groups.

Malic acid is an organic acid having the following formula:

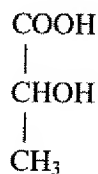


It has a two carbon chain with a carboxylic acid group attached to each carbon and a hydroxyl group attached to one of the carbons. There are two carboxylic acid groups. Because there are two carboxylic acid groups there are two possible salts –a mono salt or a di salt. If there were a mono sodium salt then there would be a sodium attached to one of the carboxylic acid groups and one free carboxylic acid group.

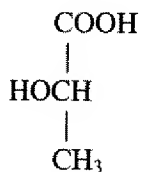
Lactic acid is an organic acid having a two carbon chain with a carboxylic acid group, a hydroxyl group and a hydrogen attached to one of the carbons. There are three hydrogens attached to the other carbon. It has a D form:



a DL form:

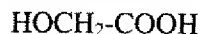


and an L form:



The difference in the forms is the position of the hydroxyl group. There is one carboxylic acid group. Because there are three forms there are three possible salts – a D salt, a DL salt and an L salt. Because there is only one carboxylic acid group a sodium attached to the carboxylic acid group would leave no free carboxylic acid group.

Glycolic acid is an organic acid having the following formula:



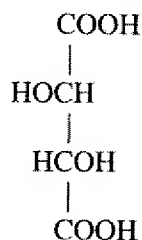
There is one carbon to which a carboxylic acid group, a hydroxyl group and two hydrogens are attached. There is one carboxylic acid group. There is one form of salt. A sodium attached to the carboxylic acid group would leave no free carboxylic acid group.

Tartaric acid is an organic acid having a two carbon chain. There is a carboxylic acid group, a hydroxyl group and a hydrogen attached to each carbon. Tartaric acid has four forms –

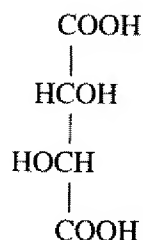
a DL form:



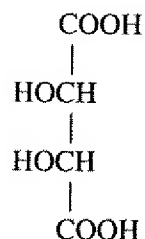
a D form:



an L form:

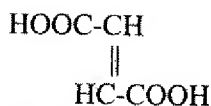


and a meso form:



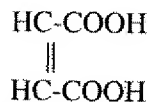
The position of each of the hydroxyl groups determines the form. There are two carboxylic acid groups. Each of the forms has two possible salts – a mono salt and a di salt. There are a total of eight salts for the four forms. A sodium attached to one of the carboxylic acid groups would leave only one free carboxylic acid group.

Fumaric acid is an organic acid having the following formula:



It has a two carbon chain in which the carbons are connected by a double bond. A carboxylic acid group and a hydrogen are attached to each of the carbons. There are two possible salts of fumaric acid – the mono salt and the di salt. A sodium attached to one of the carboxylic acid groups would leave only one free carboxylic acid group.

Maleic acid is an organic acid having the following formula:



a two carbon chain in which the carbons are connected by a double bond. A carboxylic acid group and a hydrogen are attached to each of the carbons. There are two possible salts of maleic acid – the mono salt and the di salt. A sodium attached to one of the carboxylic acid groups would leave only one free carboxylic acid group.

Malonic acid is an organic acid having the following formula:



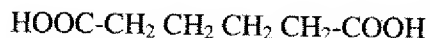
It has a single carbon to which two carboxylic acid groups and two hydrogens are attached. It can have two salts – a mono salt and a di salt. A sodium attached to one of the carboxylic acid groups would leave only one free carboxylic acid group.

Glutaric acid is an organic acid having the following formula:



It has a three carbon chain. Carboxylic acid groups are attached to the outer two carbons. A pair of hydrogens are attached to each of the carbons. There are two carboxylic acid groups. It can have two salts – a mono salt and a di salt. A sodium attached to one of the carboxylic acid groups would leave only one free carboxylic acid group.

Adipic acid is an organic acid having the following formula:



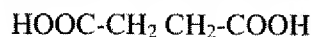
It has a four carbon chain. Carboxylic acid groups are attached to the outer two carbons. A pair of hydrogens are attached to each of the carbons. There are two carboxylic acid groups. It can have two salts – a mono salt and a di salt. A sodium attached to one of the carboxylic acid groups would leave only one free carboxylic acid group.

Acetic acid is an organic acid having the following formula:



It has a single carbon to which is attached a carboxylic acid group and three hydrogens. There is one salt – a mono salt. A sodium attached to the carboxylic acid group would leave no free carboxylic acid groups.

Succinic acid is an organic acid having the following formula:



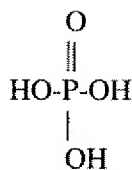
It has a two carbon chain. A carboxylic acid group and two hydrogens are attached to each carbon. There are two salts – a mono salt and a di salt. A sodium attached to one carboxylic acid group would leave one free carboxylic acid group.

Hydrochloric acid is an inorganic acid having the following formula:



A salt of hydrochloric acid would be a chloride. There are no free carboxylic acid groups.

Phosphoric acid is an inorganic acid having the following formula:



Three hydroxyl groups, and an oxygen are attached to phosphorus. There are no free carboxylic acid groups.

Owens lists 34 possible salts as being suitable as a burning chemical for cigarette paper. It is a large genus of disparate chemicals.

Two of the acids from which the salts are formed, hydrochloric and phosphoric, have no carbons. Three of the acids from which the salts are formed, glycollic, malonic and acetic, have one central carbon. Six of the acids from which the salts are formed, malic, lactic, tartaric, fumaric, maleic and succinic, have a two carbon chain. Two of these, fumaric and maleic, have a double bond in the chain; the rest do not. Two of the acids from which the salts are formed, citric and glutaric, have a three carbon chain. One of the acids from which the salts are formed, adipic, has a four carbon chain.

Two of the acids from which the salts are formed, hydrochloric and phosphoric, have no carboxylic acid groups. Three of the acids from which the salts are formed, lactic, glycollic and acetic, have only one carboxylic acid group. Eight of the acids from which the salts are formed, malic, tartaric, fumaric, maleic, malonic, glutaric, adipic and succinic, have two carboxylic acid groups. One of the acids from which the salts are formed, citric, has three carboxylic acid groups.

In a mono substituted salt, five of the salts, those formed from hydrochloric, phosphoric, lactic, glycollic and acetic acid, would have no free carboxylic acid groups. Eight of the salts, those formed from malic, tartaric, fumaric, maleic, malonic, glutaric, adipic and succinic acid, would have only one free carboxylic acid group. Only one of the salts, that formed from citric acid, would have two free carboxylic acid groups.

It is well settled that a genus does not anticipate a species. This large genus of 34 possible salts having a purpose of aiding the burning of a cigarette is not an anticipation of a mono salt of citric acid having an entirely different purpose. This large genus of 34 possible salts in the parameter table of Owens et al is not an anticipation, it is a treasure hunt, an invitation to experiment. As noted above, the chemistry of the mono salt of citric acid is different from the chemistry of all of the other possible salts. There is nothing in Owens et al that would lead one to select to select a particular salt over any of the other salts. One of ordinary skill in the art would not look to a table of burning chemicals for an answer to a problem of cockle, water fastness or compatibility with florescent whitening agents or optical brighteners.

Table I of Owens does not help.

Table I mentions potassium citrate but does not mention what potassium salt of citric acid it is. According to The Merck Index, 9th Edition, sodium citrate is trisodium citrate ($C_6H_5Na_3O_7$) and potassium citrate is tripotassium citrate ($C_6H_5K_3O_7$). The pages from the Merck Index are attached. It is assumed that Owens et al are using standard terminology.

Table I goes further. It teaches that potassium citrate should not be used alone but must be used with a citric acid and sucrose. It requires this because it is a cigarette paper and must have an appropriate flavor. Potassium citrate used by itself gives a bad flavor. It is harsh and has an aftertaste.

Table I also teaches that potassium citrate used with either citric acid alone or sucrose alone is better than potassium citrate by itself but is still not good enough. In both instances it is less harsh and has less aftertaste, but it is still harsh and still has an aftertaste.

Table I also teaches that potassium citrate must be used with both citric acid and sucrose but they must be used in the right ratio in order to get smoothness and no aftertaste. In the wrong ratio the cigarette flavor was peppery.

The position stated in the Office Action is that the cigarette paper of Owens would inherently have a cockle value of less than 0.25. Owens et al do not teach that a mono salt of citric acid will reduce cockle. Owens discloses a cigarette paper that has from 2 to 40% carbon; from 2 to 35% magnesium hydroxide; from 5 to 50% calcium carbonate; from 0.5 to 6% of a burning chemical selected from the alkali metal salts of citric, malic, lactic, glycolic, tartaric, fumaric, maleic, malonic, glutaric, adipic, acetic, succinic, hydrochloric or phosphoric acids; from 1 to 10% of an acid compatible with the burning chemical, and 1 to 10% of a mono-, di-, tri-, or poly-saccharide. This is a disclosure of a wide variety of papers having a wide variety of properties. It cannot be said with any certainty what the properties of any of these papers might be.

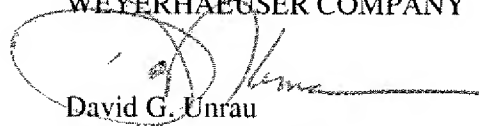
Applicant is claiming a species within this genus of properties. A genus does not anticipate a species.

Hansen et al does not cure the deficiencies of Owens.

CONCLUSION

Reconsideration and allowance of the claims presently in the application is respectfully requested.

Respectfully submitted,
WEYERHAEUSER COMPANY

A handwritten signature in dark ink, appearing to read 'David G. Unrau', is written over the printed name.

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ATTACHMENT 1: Pages from The Merck Index

THE MERCK INDEX

AN ENCYCLOPEDIA OF
CHEMICALS AND DRUGS

NINTH EDITION

Martha Windholz, *Editor*
Susan Budavari, *Associate Editor*
Lorraine Y. Stroumtsos, *Assistant Editor*
Margaret Noether Fertig, *Assistant Editor*

Published by
MERCK & CO., INC.
RAHWAY, N.J., U.S.A.

1976

CK_2O_3 ; mol wt 138.20. C 8.69%, K 56.58%, O 34.73%. K_2CO_3 .

Hygroscopic, odorless granules or granular powder. d 2.29; mp 891°. Sol in 1 part cold, 0.7 part boiling water; practically insol in alcohol. Its aq soln is strongly alkaline. pH 11.6. *Keep tightly closed.*

Sesquihydrate, small granular crystals. When it contains the full amount of water (16.36%) it is not hygroscopic. Sol in less than 1 part water; practically insol in alcohol. The aq soln is strongly alkaline.

USE: Manuf soap, glass, pottery, smalts and many potassium salts; in process engraving and lithography; tanning and finishing leather; liq shampoos; for removal of water from organic liqs; in anal. chemistry. *Caution:* Irritant, caustic. THERAP CAT: Alkalizer, diuretic.

7398. Potassium Chlorate. Potrate. KClO_3 ; mol wt 122.55. Cl 28.93%, K 31.91%, O 39.17%. KClO_3 . Contains at least 99% KClO_3 .

Colorless, lustrous crystals, or white granules or powder. d 2.32. mp 368°; above this temp it dec into perchlorate and oxygen. One gram dissolves slowly in 16.5 ml water, 1.8 ml boiling water, about 50 ml glycerol; almost insol in alcohol. *Keep out of contact with organic matter or other oxidizable substances. Caution:* Explodes with sulfuric acid; inflames with explosion if triturated with any organic substances, sulfur, phosphorus, sulfite, hypophosphite, and other oxidizable substances. *Incompat:* Iodides, tartaric acid.

Human Toxicity: Irritating to G.I. tract, kidney. Can cause hemolysis of red blood cells and methemoglobinemia. Toxic dose approx 5 g. Combined iodine and perchlorate is not recommended. Cough remedies which contain iodide are to be avoided.

USE: Explosives; fireworks; matches; printing and dyeing cotton and wool black; manuf aniline black and other dyes; source of oxygen; in chemical analyses.

THERAP CAT: Formerly as antiseptic for skin, mucous membranes.

THERAP CAT (VET): In dilute soln as antiseptic mouthwash.

7399. Potassium Chloride. Enseal potassium chloride; Chloropotassuril; Kalcorid; Kalitabs; Potavescent; Rekan; Slow-K Tablets; Span-K; Repon-K; Chlorvescent; K-Contin; Peter-Kal. KCl ; mol wt 74.55. Cl 47.56%, K 52.44%. KCl . Occurs in nature as the mineral *sylvine* or *sylvite*.

White crystals or cryst powder. d 1.98. mp 773°. One gram dissolves in 2.8 ml water, 1.8 ml boiling water, 14 ml glycerol, about 250 ml alcohol; insol in ether, acetone. Hydrochloric acid, sodium or magnesium chlorides diminish its soly in water. d of saturated aq soln at 15° is 1.172. pH: about 7.

Human Toxicity: Large doses by mouth can cause G.I. irritation, purging, weakness and circulatory disturbances.

USE: In photography; in buffer solns, electrode cells.

THERAP CAT: Electrolyte replenisher.

7400. Potassium Chromate(VI). Neutral potassium chromate. CrK_2O_7 ; mol wt 194.20. Cr 26.78%, K 40.26%, O 32.96%. K_2CrO_4 .

Lemon-yellow crystals; d 2.73; mp 975°. Sol in 1.6 parts cold, 1.2 parts boiling water; insol in alcohol. The aq soln is alkaline to litmus or phenolphthalein.

USE: Has a limited application in enamels, finishing leather, rustproofing of metals, being replaced by the sodium salt; as reagent in analytical chemistry.

7401. Potassium Citrate. $\text{C}_6\text{H}_5\text{K}_3\text{O}_7$; mol wt 306.40. C 23.52%, H 1.64%, K 38.28%, O 36.55%. $\text{K}_3\text{C}_6\text{H}_5\text{O}_7$. It is at least 99% pure.

Monohydrate, white crystals, granules or powder. Loses its water at 180°. One gram dissolves in 0.65 ml water; very slowly in 2.5 ml glycerol; almost insol in alcohol. The aq soln is alkaline to litmus; pH about 8.5.

THERAP CAT: Alkalizer. Gastric antacid.

THERAP CAT (VET): Diuretic.

7402. Potassium Citrate, Monobasic. Monopotassium citrate. $\text{C}_6\text{H}_7\text{KO}_7$; mol wt 230.21. C 31.30%, H 3.07%, K 16.98%, O 48.65%. $\text{KH}_2\text{C}_6\text{H}_5\text{O}_7$.

White, cryst powder. Sol in water; the soln is not molding.

USE: A 0.05 molal solution as standard for pH at 25° 3.776; Staples, Bates, *J. Res. Nat. Bur. Stand.* 37 (1969).

7403. Potassium Cobaltous Selenate. $\text{CoK}_2\text{O}_4\text{Se}_2$; mol wt 423.05. Co 13.93%, K 18.48%, O 30.26%, Se 37.33%. $\text{K}_2\text{Co}(\text{SeO}_4)_2$. Prep'd by evaporating a soln of the salts: von Hauer, *Sitzungsber. Akad. Wien* 39, 185 (1860).

Hexahydrate, garnet-red monoclinic crystals. Stable in air.

7404. Potassium Cyanate. CKNO ; mol wt 65.12. K 14.81%, C 48.20%, N 17.27%, O 19.72%. Aniline sickling of erythrocytes *in vitro*: Cerami, *Manitoba Nat. Acad. Sci. USA* 68, 1180 (1971). See also Sommarate. Pharmacology: Cerami *et al.*, *J. Pharmacol. Ther.* 185, 653 (1973).

White, cryst powder. d 2.05. Sol in water, very sol in alcohol. LD_{50} i.p. in mice: 320 mg/kg.

7405. Potassium Cyanide. CKN ; mol wt 65.12. K 18.44%, C 60.05%, N 21.51%. KCN . The article merce contains about 95% KCN .

White, deliquescent, granular powder or fused pieces. HCN . *Violent poison!* On exposure to air it is gradually oxidized by CO_2 and moisture. d 1.52; mp 634°. Sol in 2 part 1 part boiling water, 2 parts glycerol, 100 parts absolute methanol. The aq soln is strongly alkaline and dec. pH of 0.1N aq soln: 11.0. *Keep tightly closed, protected from light. Incompat:* Acids and acid syrups, aldehydes, chloral hydrate, iodine, metallic salts, permanganates, chlorates, peroxides. LD_{50} orally in rats: 10 mg/kg. *Toxicol. Appl. Pharmacol.* 11, 327 (1967).

Human Toxicity: Poisoning may occur by ingestion, absorption through injured skin or inhalation of cyanide, liberated by action of carbon dioxide or other acids. Strong solns are corrosive to skin. For symptoms, see Cyanide.

USE: Similar to sodium cyanide.

7406. Potassium Dichromate(VI). Potassium dichromate. $\text{Cr}_2\text{K}_2\text{O}_7$; mol wt 294.21. Cr 35.36%, K 26.3807%. $\text{K}_2\text{Cr}_2\text{O}_7$. In the U.S.A. it is usually prep'd the reaction of potassium chloride on sodium dichromate. Vetter in Kirk-Othmer *Encyclopedia of Chemical Technology*, vol. 3 (Interscience, New York, 1949) p. 951; H. Copson, *ibid.* vol. 5 (2nd ed., 1964) pp. 484-488. Many it is obtained from potassium chromate produced by roasting the chrome ore with KOH . Ref. Müllermann in *Ullmann's Encyclopedia der Technischen Chemie*, vol. 5 (Munich, 3rd ed., 1954) p. 580.

Bright orange-red crystals. Not hygroscopic or efflorescent (difference from sodium dichromate). Cryst. prismatic. Crystal system: triclinic pinacoidal, trans monoclinic at 241.6°. d_4^{25} 2.676. Bulk density: 1000 g/cm³. mp 398°. Dec at about 500°. Heat of fusion 28 kJ/mol. Heat of soln -62.5 cal/g. Specific heat 0.186 at 25°. Soluble in water. A sat'd aq soln contains at 0°: 4.32 g/100 ml; at 40°: 20.9%, at 60°: 31.3%, at 80°: 42.0%, at 100°: 50.2%. Acid reaction: A 1% aq soln has a pH of 4.2; 10% soln has a pH of 3.57.

Human Toxicity: Intern. a corrosive poison. If contact may result in ulceration of hands, destruction of mucous membranes and perforation of nasal septum. Browning. *Toxicity of Industrial Metals* (Appleton-Crofts, New York, 2nd ed., 1969) pp. 119-131. Chromium.

USE: In tanning leather, dyeing, painting, decorative printing, photolithography, pigment printing, wood, pyrotechnics, safety matches; for bleaching wax, and sponges; waterproofing fabrics; as oxidizing agent in organic chemicals; in electric batteries; as an oxidizer for dry cells. As corrosion inhibitor in prefabricated steel where lower soly is advantageous.

THERAP CAT: Pharmaceutical aid (oxidizing agent).

THERAP CAT (VET): Caustic.

7407. Potassium Dicyanoaurate(I). Gold potassium dicyanoaurate. $\text{C}_2\text{AuK}_2\text{N}_4$; mol wt 270.14. Au 68.37%, K 13.57%, N 9.72%. $\text{KAu}(\text{CN})_2$.

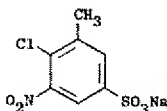
manuf and properties: Kesting, *Pulp Paper Mag. Can.* 53, no. 8, 99-104 (1952).

Slightly hygroscopic crystals or flakes, does not cake. Dec 180-200°. Powerful oxidizer, but will not explode on percussion unless in contact with oxidizable material. Sol in water (g/100 g soln): at 5°: 34; at 17°: 39; at 30°: 46; at 45°: 53; at 60°: 55.

Trihydrate, triclinic leaflets, becomes anhydr at 38° or in desiccator over KOH at room temp.

USE: In the preparation of chlorine dioxide for immediate use; in water purification; as bleaching agent for textiles, paper pulp.

8345. Sodium 6-Chloro-5-nitrotoluene-3-sulfonate. *4-Chloro-5-nitro-m-toluenesulfonic acid sodium salt.* $C_7H_4ClNNaO_5S$; mol wt 273.64. C 30.72%, H 1.84%, Cl 12.96%, N 5.12%, Na 8.40%, O 29.24%, S 11.72%.



White or slightly yellow, cryst powder. Moderately sol in water, slightly in alcohol.

USE: As reagent for determination of potassium.

8346. Sodium Chromate(VI). Neutral sodium chromate. $CrNa_2O_4$; mol wt 161.97. Cr 32.10%, Na 28.38%, O 39.51%. Na_2CrO_4 . Crystallizes as a tetra- or decahydrate.

Tetrahydrate, yellow, somewhat deliquescent crystals. Sol in about 1 part water, slightly in alcohol. The aq soln is alkaline. *Keep well closed.* The decahydrate is unstable with respect to water content and melts at about 20°.

USE: Protection of iron against corrosion and rusting.

8347. Sodium Chromate(VI), Radioactive. Sodium radio-chromate (^{51}Cr); sodium chromate- ^{51}Cr ; Rachromate. $Na_2^{51}CrO_4$.

Prepd from radioactive chromium (^{51}Cr) which has a half-life of 26.5 days. The emission of gamma rays is applicable to biological tagging and tracing. Other properties identical with those of ordinary sodium chromate. Available as soln for intravenous injection or for mixing with blood. Unbound chromate in the plasma can be reduced with ascorbic acid or may be removed by separation and washing of cells.

THERAP CAT: Diagnostic aid (blood-volume determination).

8348. Sodium Cinnamate. *Cinnamic acid sodium salt.* $C_9H_7NaO_2$; mol wt 170.14. C 63.53%, H 4.15%, Na 13.52%, O 18.81%. $C_9H_7CH=CHCOONa$.

White, cryst powder. Sol in 11 parts cold water; more sol in hot water and in water contg chlorides or nitrates; sol in about 160 parts alcohol; sol in glycerol.

8349. Sodium Citrate. Trisodium citrate; Citrosodine; Citratin. $C_6H_5Na_3O_7$; mol wt 258.07. C 27.92%, H 1.95%, Na 26.73%, O 43.40%.

Dihydrate, white, odorless crystals, granules or powder; cool, saline taste. Stable in air; becomes anhydr at 150°. Sol in 1.3 parts water, 0.6 part boiling water; insol in alcohol. The aq soln is slightly alkaline to litmus. pH about 8. LD₅₀ i.p. in rats: 6.0 mmoles/kg. Gruber, Halbeisen, *J. Pharmacol. Exp. Ther.* 94, 65 (1948).

Pentahydrate, relatively large, colorless crystals or white granules. Not as stable as the dihydrate, drying out on exposure to air and also caking. *Keep well closed.*

USE: In photography; as sequestering agent to remove trace metals, to prevent coagulation of blood; in special cheeses.

THERAP CAT: Alkalizer, diuretic, expectorant, sudorific, *in vitro* anticoagulant.

THERAP CAT (VET): Anticoagulant for collection of blood.

8350. Sodium Citrate, Acid. Disodium citrate; disodium hydrogen citrate; Alkacitron. $C_6H_7Na_2O_7$; mol wt 236.08. C 30.52%, H 2.56%, Na 19.48%, O 47.44%.

Sesquihydrate, white powder, saline taste. One gram dis-

solves in slightly less than 2 ml water; pH of a 3% w/v soln in water: 4.9 to 5.2.

USE: Anticoagulant, generally in soln with glucose, to prevent the clotting of blood intended for transfusion. Preferable to sodium citrate, since it prevents caramelization of glucose on sterilization because of its acidity. A suitable soln contains 1.7 to 2%, and 2.5% dextrose; 120 ml of the soln prevents the clotting of 420 ml blood.

8351. Sodium Cobaltinitrite. *Trisodium hexakis(nitro-to-N)cobaltate(3-); sodium hexanitrocobaltate(III).* $CoNa_3O_{11}$; mol wt 403.98. Co 14.59%, N 20.81%, Na 17.08%, O 47.53%. $Na_3Co(NO_2)_6$.

Yellow to brownish-yellow, cryst powder. Very sol in water, slightly in alc. Dec by mineral acids, but unaffected by dil acetic or similar organic acids. The aq soln dec gradually but if a few drops of acetic acid are added it may be kept for about 3 months.

USE: For the detection of potassium with which it forms a slightly sol compd.

8352. Sodium Cresotate. $C_7H_7NaO_3$; mol wt 174.13. C 55.18%, H 4.05%, Na 13.21%, O 27.56%. $CH_3(OH)C_6H_4COONa$. It is usually a mixture of the salts of 2 or 3 isomeric cresotic acids.

White to reddish, microcryst powder; bitter taste. Sol in water, alc.

8353. Sodium Cyanate. *Cyanic acid sodium salt.* $CNNaO$; mol wt 65.01. C 18.47%, N 21.55%, Na 35.36%, O 24.61%. NaOCN. Prepn and properties: *Gmelin's Sodium* (8th ed.) 21, 799-801 (1928) and supplement, part 4, 1382-1386 (1967). Used experimentally in treatment of sickle cell anemia. Effect of cyanate on sickling: May et al., *Lancet* 658 (1972); Cerami et al., *Fed. Proc.* 32, 1668 (1973). Pharmacology and toxicology: Cerami et al., *J. Pharmacol. Exp. Ther.* 185, 653 (1973). Clinical studies: Peterson et al., *ibid.* 189, 577 (1974); Gillette et al., *N. Engl. J. Med.* 290, 104 (1974).

Colorless needles from alcohol. d_4^{20} 1.893. mp 550°. Sol in water; decomposes to form Na_2CO_3 and urea. Sol in alc (0°): 0.22 g/100 g solvent. Insol in ether. LD₅₀ i.p. in mice 260 mg/kg.

8354. Sodium Cyanide. Cyanogran. $CNNa$; mol wt 49.02. C 24.50%, N 28.58%, Na 46.92%. NaCN. This cyanide of commerce is 95-98% pure. Mixtures of sodium cyanide with sodium chloride or carbonate for special uses are also marketed.

White granules or fused pieces. *Violent poison!* Odorless when perfectly dry; somewhat deliquescent in damp air and emits slight odor of HCN. mp 563°. Freely sol in water, slightly in alcohol. The aq soln is strongly alkaline and rapidly decomposes; the soln readily dissolves gold and silver in presence of air. *Keep well closed.* LD₅₀ orally in mice 15 mg/kg. Smyth et al., *Am. Ind. Hyg. Assoc. J.* 30, 31 (1969).

USE: Extracting gold and silver from ores; electroplating baths; fumigating citrus and other fruit trees, ships, railcars, warehouses, etc.; manuf hydrocyanic acid and many other cyanides; case hardening of steel. *Caution:* See Hydrogen Cyanide.

8355. Sodium Diacetate. Sodium acid acetate; $NaCH_3COONa \cdot CH_3COOH$. Described as a "bound" compound of sodium acetate and acetic acid. Commercial development: Union Carbide; Stein, Hall & Co.

White powder, dec above 150°. Sol in water, liberates 42.25% available acetic acid.

USE: Acetic acid in solid form; as an inhibitor of mold and rope-forming bacteria in bread: Glabe, *Food Ind. Hyg.* no. 2, 46 (1942).

8356. Sodium Dichromate(VI). Sodium bichromate; chromate of soda. $Cr_2Na_2O_7$; mol wt 261.96. Cr 26.5%, Na 17.55%, O 42.75%. $Na_2Cr_2O_7$. Usually prepd from CrO_3 and H_2SO_4 . Description of industrial processes: Ullmann, Glissmann in *Ullmann's Encyklopädie der Technischen Chemie* vol. 5 (Munich, 3rd ed., 1954) p 575.

Dihydrate, reddish to bright orange, somewhat deliquescent crystals. Crystal system: monoclinic. Crystal habit: elongated prismatic. d_4^{25} 2.348. Bulk mass